

REMARKS

Currently, claims 1-10 are pending and claims 6-10 have been examined.

Drawings

The Examiner objected to the drawing as not showing every feature of the invention specified in the claims. In particular, the Examiner is of the view that the "variable frequency variable duty cycle pulse width modulated inverter" is not represented in any of the drawings. As discussed on page 5, lines 15-21 and 24-31, the microprocessor controls the switching devices using switching signals which are pulse width modulated with a variable duty cycle and variable frequency. Applicant has amended line 19 to replace "microprocessor (not shown)" with "microprocessor 17" and have amended Figure 4 as shown in the enclosed "Replacement Sheet" to connect switches A+, A-, B+ and B- to microprocessor 17, switches A+, A-, B+ and B- and the voltage rails provide and exemplary variable frequency variable duty cycle pulse width modulated inverter.

Specification

The Examiner objected to the Abstract as it contains legal phraseology (means). In order to overcome the Examiner's objection the term "means" has been replaced with "system" in the enclosed replacement Abstract. A clean copy of the Abstract is enclosed.

The Examiner also objected to the incorporation of essential material by making reference to a foreign patent on page 5, lines 24-26 and page 8, line 5. These foreign references have been replaced with their United States equivalents being:

1. United States Patent No. 4,813,248 which claims priority from NZ
215389/217623/218358.

2. United States Patent No. 5,604,387 which is equivalent to AU65 1406

(incorrectly referred to as AU65 1408 in the specification).

The Examiner is also of the view that the disclosure is directed to New Zealand Patent No. 236551 and not the priority document NZ332836. Applicant submits that the foreign priority claim to NZ332836 is correct, which has formed the basis for United States Patent No. 6,748,618 from which the present application has been divided. NZ236551 is the priority document from which granted United States Patent No. 5,604,387 is based. However, Applicant submits that as a result of the typographical error in the Australian patent number, this objection resulted and its replacement with the correct United States equivalent number resolves this issue.

The Examiner further objected to the specification as failing to provide proper antecedent basis for the claimed subject matter. In particular, the Examiner is of the view that the specification lacks antecedent basis for a "variable frequency variable duty cycle pulse width modulated inverter". Applicant submits that the remarks in relation to the drawings addresses and overcomes this objection.

The Examiner has objected to the title as not being descriptive of the claimed invention. In light of the Examiner's objection, Applicant has amended the title to read "A variable speed electric motor control circuit for a drain pump". If this title is not satisfactory, Applicant requests that the Examiner suggest a title.

Claim Rejections - 35 U.S.C. §112

The Examiner rejected claims 6-10 under 35 U.S.C. §112, as failing to comply with the written description requirement. Specifically, the Examiner is of the view that the means plus function language does not meet the written description requirement. Applicant will take each of the rejections in turn:

(a) Water level detection means

This feature is discussed in page 5, lines 24-26. United States Patent No. 4,813,248 discloses a washing machine incorporating a "floating" spin tub (or bowl) which, at low (or no) water levels is engaged with the motor shaft for spin actions and at higher motor levels, the spin tub floats free of its interconnection with the shaft to allow the agitator to be driven independently of the spin tub. By detecting when the bowl changes from disconnected to connected or visa versa, it is possible to detect that the water level is at the "bowl float" level.

(b) Voltage Monitoring Means

The detected mains voltage is continuously monitored by the microprocessor which is programmed to compensate for variations of the mains voltage by adjusting the duty cycle in order to provide a constant torque in the drain pump over a wide range of mains conditions. The voltage monitoring function is clearly described in page 6, lines 28-33 whereby the microprocessor provides the means for monitoring voltage and adjusts the duty cycle accordingly.

(c) Peak current detection means

On page 7, lines 18-24, current peaks in the pump windings are monitored by the microprocessor. Hence, the microprocessor provides the means for detecting peak current.

Applicant submits that the Examiner's rejection is overcome. Reconsideration and withdrawal of the rejection is requested.

Claim Rejections - 35 U.S.C. §102

Claims 6-10 were rejected as allegedly being anticipated by United States Patent No. 5,604,387 to Cheyne because Cheyne discloses a number of features that are the same as that disclosed in the claimed invention. However, claim 6 of the present application requires:

1. A variable frequency variable duty cycle inverter to control the power being supplied to an electric motor,
2. A water level detection mechanism to detect low water levels in the washing machine, and
3. A controller which causes the inverter frequency to vary as a result of a low water level being detected.

None of these features are disclosed in Cheyne nor in NZ223460 or its United States equivalent 4,978,058. First, there is no disclosure in Cheyne that the PWM controller is variable frequency. Second, while Cheyne in Col. 5, line 18 mentions filling the container to a desired water level, there is no disclosure of a mechanism to detect water level. Third, because the inverter is fixed frequency and because no water level detection mechanism is provided, Cheyne does not disclose a controller which, in response to the water level detection means, decreases the inverter's frequency.

Therefore, Applicant submits that the claims are novel over Cheyne. Reconsideration and allowance is requested.

Information Disclosure Statements

Applicant submitted an Information Disclosure Statement with the patent application when originally filed which cited four (4) United States Patents, three (3) Japanese publications and one (1) European publication. Consideration and return of the initialed form is requested.

In addition, Applicant submitted an Information Disclosure Statement on April 28, 2005 and requests consideration of same.

Applicant has concurrently submitted a Petition for a One-Month Extension of Time to extend the date for response up to and including July 11, 2005.

In view of the above Amendments and Remarks, Applicant respectfully submits that the claims of the application are allowable over the rejections of the Examiner. Should the Examiner have any questions regarding this Amendment, the Examiner is invited to contact one of the undersigned attorneys at (312) 704-1890.

Respectfully submitted,

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